

**REMARKS**

Claims 2-9 and 11-14 are pending in this application. By this Amendment, claims 2-6 and 11-13 are amended and claim 10 is canceled. Support for the amendments to the claims may be found, for example, in the claims as originally filed and the specification at paragraphs [0018]-[0020] and [0059]-[0060]. No new matter is added.

In view of the foregoing amendments and following remarks, reconsideration and allowance are respectfully requested.

**I. Rejections Under 35 U.S.C. §112**

**A. Rejections Under 35 U.S.C. §112, Second Paragraph**

**1. Claims 5/1, 6/1 and 11-14**

The Office Action rejects claims 5/1, 6/1 and 11-14 under 35 U.S.C. §112, second paragraph, as allegedly being indefinite, and rejects claims 5/1, 6/1 and 11-14 under 35 U.S.C. §112, second paragraph, as being of improper form for failing to further limit the subject matter of a previous claim. Both of these rejections stem from the cancellation of claim 1 without amending the dependency of the above-rejected claims. By this Amendment, claims 5, 6 and 11-14 are amended to properly depend from claims that are not cancelled. Accordingly, reconsideration and withdrawal of the rejections are respectfully requested.

**2. Claim 10**

The Office Action rejects claim 10 under 35 U.S.C. §112, second paragraph, as allegedly being indefinite. By this Amendment claim 10 is canceled, thus the rejection is moot.

**B. Rejections Under 35 U.S.C. §112, First Paragraph**

The Office Action rejects claims 2-14 under 35 U.S.C. §112, first paragraph, as allegedly failing to comply with the written description requirement. By this Amendment,

claim 10 is canceled, thus the rejection is moot as to that claim. As to the remaining claims, Applicant respectfully traverses the rejection.

This rejection is directed to the previously claimed feature of "at least one of the polymer compound and the compound has a s-triazine trione skeleton" in claim 2, or similar features previously recited in independent claims 3 and 4. For example, the Office Action, on page 3, asserts that "with respect to the 's-triazine trione skeleton' being part of anything beyond the compounds with a molecular weight of 2000 or less is not so clearly defined as to allow a worker of ordinary skill in the art to see."

By this Amendment, the feature of the s-triazine trione skeleton is removed from claims 2 and 4, and claim 3 is amended to recite, *inter alia*, "... a semiconductor device comprising a s-triazine trione skeleton compound with a molecular weight of 2000 or less having at least two epoxy groups ...." Accordingly, Applicant respectfully asserts that the specification, at least at paragraphs [0059] and [0060], support the s-triazine trione skeleton compound with a molecular weight of 2000 or less. For example, as asserted in previous responses, the compounds of formula 2 are triazine trione compounds having an epoxy group, and the specific examples thereof include tris(2,3-epoxypropyl) isocyanurate, monoallyl diglycidyl isocyanurate and the like. See specification, paragraph [0060].

Thus, Applicant respectfully asserts that claims 2-4, and all the claims depending from claims 2-4, meet the written description requirement of 35 U.S.C. §112, first paragraph. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

## **II. Rejection Under 35 U.S.C. §102**

The Office Action rejects claims 2 and 8 under 35 U.S.C. §102(b) over U.S. Patent No. 5,380,804 to Lees et al. ("Lees"). Applicant respectfully traverses the rejection.

By this Amendment, claim 2 recites, *inter alia*, "... a polymer compound produced by addition polymerization having an epoxy group; a compound with a molecular weight of

2000 or less having at least two carboxyl groups, or protected carboxyl groups; and a solvent." Applicant respectfully submits that Lees fails to disclose at least the above features of claim 2.

The Office Action asserts that the "issue of anticipate is specific to the one specie of the composition reproduced below...." The Office Action then reproduces Example 3 of Lees. Office Action, pages 4 and 5. Example 3 of Lees discloses applying a mixture of glycidyl methacrylate (GMA) copolymers, 1,3,5-tris-(2-carboxyethyl)isocyanurate (TCI) crosslinking agent, and a cure catalyst in dimethylformamide to panels. The Office Action asserts that the GMA of Lees Example 3 discloses the claimed polymer. See Office Action, page 5. However, Applicant respectfully asserts that Lees fails to disclose that the GMA is produced by addition polymerization. Specifically, Lees clearly discloses that TCI is added to the mixture as a "crosslinker" to aid the crosslinking of the GMA polymers. Therefore, the polymer disclosed in the final product of Example 3 in Lees is polymer formed from crosslinked GMA polymers and not a polymer produced by addition polymerization, as recited in claim 2. Lees thus fails to disclose each and every feature of claim 2.

Lees does not anticipate claim 2. Claim 8 depends from claim 2 and, thus, also is not anticipated by Lees. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

### **III. Rejection Under 35 U.S.C. §103**

The Office Action rejects claims 3, 7 and 9 under 35 U.S.C. §103(a) as obvious over WO 02/086624 to Kishioka et al. ("Kishioka") (citations taken from U.S. National stage document, U.S. Patent Application Publication No. 2004/0110096). Applicant respectfully traverses the rejection.

By this Amendment, claim 3 recites, *inter alia*, "... an s-triazine trione skeleton compound with a molecular weight of 2000 or less having at least two epoxy groups; a

polymer compound having a phenolic hydroxyl group, a carboxyl group, a protected carboxyl group or an acid anhydride structure...." Applicant respectfully asserts that Kishioka would not have rendered obvious at least the above features of claim 3.

The Office Action, on pages 8-9, asserts that formula (1) of Kishioka may be a triglycidyl isocyanurate where  $R^1$ ,  $R^2$  and  $R^3$  are epoxy derivatives (specifically glycidyl), and that paragraph [0043] of Kishioka discloses resin compounds that may be mixed with the compounds of formula (1) that include poly hydroxystyrene, polymaleic acid, polyacrylic acid and polymethacrylic acid. However, the Office Action, on page 8, acknowledges that Kishioka fails to disclose a triglycidyl isocyanurate compound mixed with a polymer having either a phenolic hydroxyl group, a carboxylic acid group, a protected carboxyl group or an acid anhydride structure, as recited in claim 3. Regardless, the Office Action asserts that it would have been obvious for one of ordinary skill in the art to have combined a triglycidyl isocyanurate embodiment of Kishioka formula (1) and a polymer having either phenolic hydroxyl group, a carboxyl group, a protected carboxyl group or an acid anhydride structure from the disclosure of Kishioka. Applicant respectfully disagrees.

Applicant's specification recites that when a composition having a compound with at least two epoxy groups and a polymer having a phenolic hydroxy group, carboxyl group, protected carboxyl group or acid anhydride structure is applied on a semiconductor substrate and baked to form an underlayer coating, the epoxy groups are reacted with the phenolic hydroxy group, carboxyl group, protected carboxyl group or acid anhydride structure, and thereby the ring-opening reaction of the epoxy groups occur. See specification, paragraph [0062]. As a result, the polymer compound is reacted with the compound with a molecular weight of 2000 or less, and a three- dimensional crosslinked structure is formed between the polymer compound and the compound with a molecular weight of 2000 or less. Id. The formed underlayer coating thus becomes tight, and comes to have a low solubility in an

organic solvent generally used for the photoresist composition applied on the underlayer coating, such as ethylene glycol monomethyl ether, ethyl cellosolve acetate, and the like. *Id.* Thus, the underlayer coating formed from the underlayer anti-reflective coating forming composition according to claim 3 results in no intermixing with photoresists, and the claimed underlayer anti-reflective coating forming composition does not require any catalyst or crosslinking agent. See specification, paragraph [0063].

Also, the specification recites that triazine trione compounds are preferred light absorbing compounds. See specification, paragraph [0067]. Thus, if the light absorbing compound is also part of the compound with a molecular weight of 2000 or less, as recited in claim 3, the light absorbing compound will be well dispersed in the three-dimensional crosslinked structure and all of the above-recited advantages may be realized without any interference or declining effects from the light absorbing compound. Therefore, the specification clearly discloses the benefits and advantages of using a resist underlayer anti-reflective coating forming composition as recited in claim 3.

Alternatively, Kishioka discloses that  $R^1$ ,  $R^2$  and  $R^3$  in formula (1) may independently be 32 different groups that may be combined in any combination. See Kishioka, paragraph [0026]. Thus, Kishioka discloses 32,768 possible combinations for formula (1), of which the Office Action asserts that one specific combination discloses the compound with a molecular weight of 2000 or less as recited in claim 3. Kishioka also discloses 27 possible resins that may be used with the compounds disclosed in Kishioka formula (1), of which the Office Action asserts 4 disclose the polymer as recited in claim 3. Therefore, if one of ordinary skill in the art were to have chosen the one embodiment of the 32,768 possible embodiments of Kishioka formula (1) that allegedly discloses the compound with a molecular weight of 2000 or less recited in claim 3, he or she would have been required to combine that specific embodiment of Kishioka formula (1) with four specific resins out of 27 disclosed in order to

yield the resist underlayer anti-reflective coating forming composition of claim 3. Put differently, the Office Action asserts that it would have been obvious for one of ordinary skill in the art to have chosen 4 compound and polymer combinations out of a possible 884,736 compound and resin combinations disclosed in Kishioka. Applicant respectfully submits that this is well beyond the scope of the "obvious to try" doctrine.

Also, one of ordinary skill in the art would have been required to have selected the four combinations that allegedly disclose the features of claim 3 out of the possible 884,736 combinations at random, because Kishioka fails to provide any reason or rationale for one of ordinary skill in the art to have chosen the one specific embodiment of Kishioka formula (1) that allegedly discloses the compound recited in claim 3 and a polymer having a phenolic hydroxyl group, a carboxyl group, a protected carboxyl group or an acid anhydride structure. In light of the above, Applicant respectfully asserts that the present specification discloses specific benefits and desirability for using the resist underlayer anti-reflective coating forming composition as recited in claim 3, but that it would not have been obvious from the disclosure of Kishioka for one of ordinary skill in the art to have chosen the claimed resist underlayer anti-reflective coating forming composition from the disclosure of Kishioka as asserted in the Office Action.

Kishioka would not have rendered obvious claim 3. Claims 7 and 9 variously depend from claim 3 and, thus, also would not have been rendered obvious by Kishioka. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

#### **IV. Conclusion**

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of the application are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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Attachments:

Request for Continued Examination  
Petition for Extension of Time

Date: April 6, 2009

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